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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,700	06/10/2005	Remo Meister	0115-051645	3788

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EXAMINER	
JIANG, CHEN WEN	

ART UNIT	PAPER NUMBER
3744	

MAIL DATE	DELIVERY MODE
02/26/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/538,700	MEISTER, REMO	
	Examiner	Art Unit	
	Chen-Wen Jiang	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

Content of Specification

(a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive, preferably from two to seven words may not contain more than 500 characters.

(b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.

(c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.

(d) The Names Of The Parties To A Joint Research Agreement: See 37 CFR 1.71(g).

(e) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.

(f) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:

(1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."

(2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."

(g) ***Brief Summary of the Invention*: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary**

is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

(h) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.

(i) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.

(j) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).

(k) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).

(l) Sequence Listing, See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 11, 12, 15, 16 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Caesar et al. (U.S. Patent Number 6,817,193).

Applicant asserts that Caesar does not disclose controlling of the onset point of the evaporation. In response, Caesar discloses the pressure drops in the circuit can be corrected in accordance with the circulating mass flow and the temperature on entry to the valve is determined (C-3, L-60-65). Also, Caesar discloses measuring high-pressure and low-pressure side pressures and the valve is controlled to regulate the pressure level of the refrigerant circuit on the on the high-pressure side (Claim 1). The refrigerant mass flow and the refrigerant pressure are one-to-one correspondent and related. In regard to claim 11, Caesar et al. teach a method for controlling evaporators in refrigeration plants, wherein control is carried out after the evaporation process has begun, with the evaporation pressure (P5) at the inlet of the evaporator (5) normally being used as one control variable and the refrigerant supercooling temperature (T3 or T4) upstream of the injection valve (4) being used as second control variable, so that in this

way the start of evaporation is defined and controlled (Fig. 1; C-3, L-20-67; C-4, L-1-41; C-5, L-1-10).

In regard to claim 12, Caesar et al. teaches an internal heat exchanger (IHE) (9) is connected downstream of the evaporator (5) (Fig. 1).

In regard to claim 15, Caesar et al. teach that the control is affected optimally for the particular type of evaporator, near to the left-hand limit curve of the lg p, h diagram for refrigerant (C-3, L-55-65; C-4, L-56-63).

In regard to claim 16, Caesar et al. teach that the control causes the evaporator to be flooded and the degree of flooding to be determined, and at the same time causes the refrigerant suction vapor temperature and refrigerant liquid temperature to be monitored and controlled (Fig. 1; C-5, L-1-10).

In regard to claim 18, referring to Fig.2, Caesar discloses the phase-boundary curve having a left-hand rising part, a maximum and a right-hand falling part, and wherein the optimum of the process is always in favor of the evaporator and not the IHE to achieve maximum utilization of the enthalpy in the evaporator between the left-hand and right-hand parts of the phase-boundary curves of the lg [p, h) diagram for the refrigerant and, depending on the temperature level of the IHE, with a superheating component in the evaporator.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caesar et al. (U.S. Patent Number 6,817,193) in view of Yoshihiko (JP-2002267279).

Caesar et al. discloses the invention substantially as claimed. However, Caesar et al. does not disclose compressor control. Yoshihiko teaches that the measured value for limiting suction vapor temperature upstream of the compressor (any measured temperature upstream of the compressor) over-controls the evaporation control and keeps the suction vapor temperature constant at an optimum value as a function of the compressor (Yoshihiko measures temperatures upstream of the compressor via sensors 14 and 17. The temperature sensed by sensor 14 over-controls the evaporation control. The temperature at the exit of the evaporator (suction vapor temperature) is holding constant because it is set by temperature setting means 22. This value is used as optimum value as a function of the compressor.) (paragraphs 0007-0017). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Caesar et al. with a compressor control in view of Yoshihiko so as to improve performance of the system.

5. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caesar et al. (U.S. Patent Number 6,817,193) as applied to claim 11 above, and further in view of Shunji et al. (EP-1014013).

In regard to claim 13, Caesar et al. teach most of the limitation of the claim but do not explicitly teach a further measured value such as a vapor temperature at the compressor inlet to optimize the control of the evaporators and ensure protection for the compressor. Shunji et al. teach measuring the suction vapor temperature at the compressor (2) inlet (via sensor 10) to control the evaporators and ensure protection for the compressor (2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Caesar et al. so that the evaporators can also be controlled based on the suction vapor temperature at the compressor inlet as taught by Shunji et al. in order to advantageously improve the efficiency of the evaporators and the compressor.

In regard to claim 14, Caesar et al. teach most of the limitation of the claim but do not explicitly teach a further measured value such as a hot-gas temperature at the exit of the compressor. Shunji et al. teach measuring the hot-gas temperature at the exit of the compressor (2) (via sensor 12) to control the evaporators and ensure protection for the compressor (2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Caesar et al. so that the evaporators can also be controlled based on the hot-gas temperature at the exit of the compressor as taught by Shunji et al. in order to advantageously improve the efficiency of the compressor and also protect the compressor since the hot-gas temperature at the exit of the compressor defines the operational characteristic of the compressor.

6. Claims 18-20 and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caesar et al. (U.S. Patent Number 6,817,193) as applied to claim 11 above.

In regard to claim 18, Caesar et al. teach most of the limitations of the claim but do not explicitly teach that the optimum process is always in favor of the evaporator. The general concept of providing maximum utilization of enthalpy in the evaporator falls within the realm of common knowledge as obvious mechanical expedient and one of ordinary skill in the art at the time of the invention was made would know that maximum utilization of the enthalpy in he evaporator will be in favor of the evaporator, and this maximum utilization will also depend on the other factors of the refrigeration system such as temperature level of the IHE, and etc.

In regard to claims 19, 20, and 22-26, Applicant admits that it is irrelevant whether the refrigeration system comprises one or a plurality of evaporators, one or a plurality of IHEs, one or plurality of compressors, or one or a plurality of injection valves, and whether or not they are combined to form groups. It is also irrelevant whether or not one or more evaporators are combined into groups with only one or more IHEs. Any combination of injection valves, evaporators, IHEs, and compressors is therefore possible (Specification, page 6 lines 6-16; or US Pub No: 2006/0242974 paragraph 0027). Since Caesar et al. teach the method of claim 11, than it would have been obvious to one having ordinary skill in the art at the time the invention was made to apply this method to a refrigeration system with any combination of injection valves, evaporators, IHEs, and compressors.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chen-Wen Jiang whose telephone number is (571) 272-4809. The examiner can normally be reached on Monday-Thursday from 8:00 to 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Chen-Wen Jiang/
Primary Examiner, Art Unit 3744